The Casimir force and micro-electromechanical systems at submicron-scale separations

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Stellingen

behorende bij het proefschrift

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1. Non-Gaussian statistically rare high asperities on gold films have a considerable influence on Casimir and electrostatic forces at separations below 100 nm.
2. At submicron-scale separations, the Casimir force significantly affects the actuation dynamics of components of micro electro-mechanical systems (MEMS) operating in clean and dry conditions.
3. Contrary to popular belief, surface roughness has certain benefits in terms of preventing stiction of MEMS components.
4. In a damped driven micro-mechanical Casimir oscillator, a flat surface is more susceptible to chaotic motion than a rough surface.
5. The applicability of extreme value statistics to rough gold surfaces implies the failure of the analogue between rough surfaces and periodic geometries.
6. There is no physical distinction between interactions arising from electromagnetic field fluctuations and those arising from charge fluctuations in materials.
7. The fact that several sources report significantly different results for permittivities of metals makes a good case for using one's own measured dielectric data.
8. The use of the prefix 'ultra' in a scientific context ignores several centuries of efforts to develop a scientific unit system.
9. Statistically rare extreme events can have a tremendous impact, not only in weather but also in politics.